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inexhaustible fertility of these favoured regions. To these the cities of the Tetrapolis, viz., Antioch, Apamea, Laodicea, and Seleucia, with many others, owed their origin and rapid prosperity; and if it was worth while to construct such magnificent works for the convenience of *their* commerce, it surely ought to be worth the while of their successors—the present occupants—since the riches of the soil are still to be obtained by industry, to avail themselves of these noble legacies, and especially to restore the port of Seleucia, which would require so small a proportion of the labour and expense originally bestowed upon it.

The result would be very beneficial to the Turkish empire, by adding to the revenues of the Sultan, and by infusing vigour into the provinces which now languish through the efforts made for the prosperity of the capital.

To Great Britain, also, the advantages would be undeniable, in opening new channels for our commerce, and by facilitating the communication with her Majesty's eastern dominions.

XIII.—*An Attempt to account for numerous Appearances of sudden and violent Drainage on the Sides of the Basin of the Dead Sea.*

By Captain W. ALLEN, R.N., F.R.S., F.R.G.S.

Read January 10, 1853.

THE Dead Sea, or Lake Asphaltites of the ancients, is now generally understood to have a depression, below the level of the Mediterranean Sea, of more than 1300 feet: yet, hitherto, no satisfactory account has been given of the cause of this phenomenon.

If I venture on the subject, it is simply to record impressions, forced on my mind by certain features that arrested attention in approaching its mysterious shores by the route of Jericho.

These were principally—

1st. Some indications of alluvial deposit on the mountain sides, a little below the supposed point of the level of the Mediterranean, most apparent on the opposite range of Belka.

2nd. A succession of sand cliffs on both banks of the river Jordan, of corresponding forms and appearance.

3rd. Several parallel lines of pebbles, about 50 feet in width, near the northern shore of the Dead Sea. These were the more remarkable because, for several miles, not a stone had been seen; and between the lines the soil was a soft alluvium. They have the appearance of raised beaches, and perfectly resemble the actual beach of the lake, which is formed principally of flat pebbles of bituminous shale, with fragments of Lydian stone. No other specimens of bitumen were seen.

4th. The precipitous mountains bordering the lake are rent with ravines, and their innumerable peaks have a tendency to group themselves into a succession of plateaux.

5th. On leaving the N.W. angle of the beach some remarkable hills were passed, capped with a horizontal stratum of sedimentary formation, and having steep, furrowed sides On ascending the mountain road these characteristics became gradually less distinct, and at length were to be detected in a general sense only.

Similar features have been noticed by other travellers—such as terraces and cliffs in the southern and northern Ghor, which both slope towards the Dead Sea.

Now, if these remains of sedimentary deposit should be admitted as so many evidences of successive falling of the surface of the Dead Sea, it is presumable that its original level may be traced by these gradations to a coincidence with that of the Gulf of Akabà, to which this basin may then have been joined.

On this supposition the Lake Asphaltites, in its original state, was the upper end of a very long and narrow arm of the Indian Ocean, extending from the base of Anti-Libanus nearly 2000 miles.

The bed of this fissure must have been undulating, and was divided into several basins by narrow straits. Of these, one at Akabà may have been closed, at some unknown period, either by a gradual upheaving of the land, or, in another manner, by the growth of coral, by deposits of sand and gravel thrown up by the sea, and by the sandstorms of the desert.

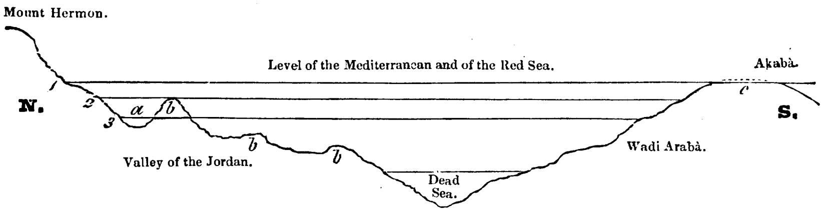
That the latter is not a gratuitous assumption will appear from the present condition of the strait Tiràhn; where two well-defined banks, possibly of coral, appear to be advancing from the opposite salient shores; and between these banks the opening is little more than half a mile wide, and of unknown depth.

The action of similar causes may, therefore, have succeeded in converting the hypothetical strait at the upper end of the gulf of Akabà, into dry land; and communication being thus cut off, the surface of the basin of Asphaltites, being of greatly preponderating extent, as compared with the volume of water poured into it by the Jordan and other small perennial streams and winter torrents, evaporation from it would be in proportionate excess, and would speedily have caused its level to fall and its limits to contract.

The simple effect of evaporation would have left the whole drained bed of the basin with a covering of alluvium; but the interrupted lines of silt seen at different elevations, the terraces, the sand-cliffs, the parallel beaches, the flat-topped hills and the rugged ravines, would concur in showing that these levels were not always gentle and gradual in their subsidence, but that the lake has been subject to occasional and sudden changes, of which these are the monumental records.

I proceed to show how this sudden drainage may have been the result of the modification of local circumstances.

For, granted that the basin cut off from the great fissure had also its undulations or irregularities in depth, then, since evaporation would have caused its surface to fall, let us suppose it to have fallen from the upper line in the diagram—representing the level of the Mediterranean—to the first undulation or barrier at *b*. The further process of evaporation would have caused a division of the waters at this point into two basins, of which the upper, having the Jordan running through it, would, for the time, have preserved its level at the second line, while that of the other and larger basin would have continued to fall. Suppose it to have fallen to the third line, and then, by the weight of water in the upper basin, or by the action of the current of the Jordan, or by their combined effect, that the barrier should have been forced or cut through; the water of the upper would then have been transferred to the lower and larger basin, with a violence that would have torn and scoured its ancient bed, leaving traces of its former level round the margin, and marks of its action in ragged ravines.



a. Lake Tiberias. *b. b. b.* Barrier. *c.* Dried Strait.
1. First line. 2. Second line. 3. Third line.

But if the lower strata of the barrier had been of rock, hard enough to have resisted the action of the torrent, then a part of the water would have been retained in a depression, forming a fresh-water lake, as Tiberias, the sea of Chinnereth.

The process would have gone on, dividing the surface at the successive barriers; which also, having been forced, similar effects would have been produced by the violently retreating waters, leaving such vestiges as the monticules with their crowning attestations of a former level, the sand cliffs on the banks of the Jordan, and the more recently-formed parallel beaches, noticed on the N. shore of the Dead Sea.

As, however, none of the barriers have been hard enough to resist, except that at Tiberias, this is the only reservoir of fresh water that remains; and the Jordan winds its rapid course down the slope of the Ghor, to the last deep and central basin, the Dead

Sea; where the excessive saltness of the water will now be naturally accounted for, since it is a condensation of that which, having been a part of the ocean, was salt *ab origine.*

The process of evaporation and depression would still continue, till the surface of the Dead Sea should be reduced to such an area as would just balance the water discharged into it; and then, the only changes would be in the oscillations of that balance, caused by extraordinary floods or droughts.

From a fact observed by travellers in three consecutive years, namely, that a salient part of the N. shore is sometimes an island, and sometimes peninsular, there is some reason for conjecturing that the point of equilibrium has been already reached.

This might be ascertained by more careful observations at that locality, or by comparing fresh lines of soundings with those taken by Captain Lynch, U.S.N., in the southern portion of the sea: "The bay that looketh south."

XIV.—*On the Watershed of Wadi el Arabà.* By Captain WILLIAM ALLEN, R.N., F.R.S., F.R.G.S.

Read February 14, 1853.

As the existence of the great depression of the Dead Sea, below the level of the Mediterranean, was unknown till the year 1837, so the fact of the downward slope of Wadi el Arabà, though the necessary consequence of such depression, was overlooked till the Comte de Bertou traversed its whole length in 1838. For so gradual does the inclination appear, that it was generally considered as a plain; and many geographers had even entertained the idea, that the river Jordan anciently discharged itself into the Gulf of Akabà by this valley.

The fallacy of this was first proved by that traveller; but the extent and elevation of the tract of land lying between the northern margin of the Gulf of Akabà and the point, at the same level in Wadi Arabà, where commences the downward slope to the Dead Sea, is a problem that still remains to be solved.

This tract of land contains the ridge that separates the torrents flowing northwards, on one side, to the Dead Sea, and southwards on the other, towards the Gulf of Akabà. It is the "watershed," or waterparting, of the Wadi Arabà.

As the notices that have been given by travellers on this important point of physical geography—though at first sight they appear to be conclusive—are conflicting among themselves, I have thought it desirable to lay them before the Society, in order that we may be able to estimate the amount of knowledge now existing, as far as I can collect, on the subject.